

Mecheleciiv



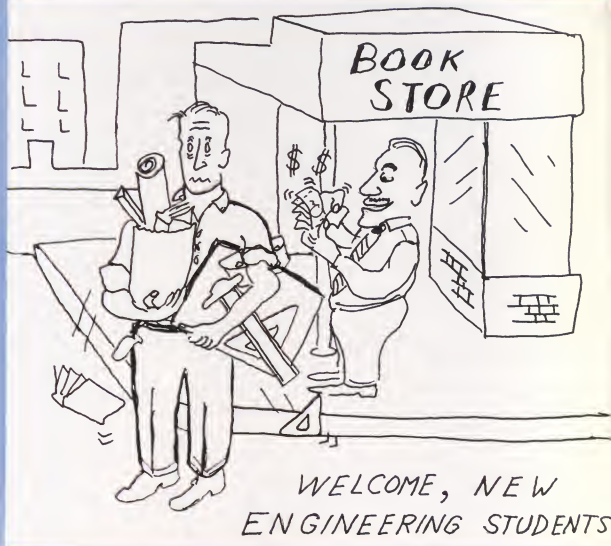
VOL. 18

OCTOBER, 1958

NO. 1

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- A SHORT TOUR OF DUTY
- WHY SCHOOL ACTIVITIES?



**SCHOOL OF ENGINEERING
THE GEORGE WASHINGTON UNIVERSITY**

OCTOBER 1958



Design a 2-lane steel bridge to cross a modern highway— \$44,000 in cash awards!

American Bridge Division of United States Steel announces a \$44,000 **STEEL HIGHWAY BRIDGE DESIGN COMPETITION** dedicated to stimulating the engineering mind to a more imaginative, more effective use of steel in the construction of small bridges.

If you, as a professional or design engineer or as a college engineering student, can come up with a more imaginative, attractive and economical design, not only may you win up to \$15,000 in award money, but your efforts may contribute materially to the most challenging road-building program ever undertaken. For, according to conservative estimates, the tremendous 41,000-mile Federal Highway Program will call for the construction of at least a bridge a mile!

The competition involves solving a relatively simple but important problem that will not demand too much of your time.

Send for your entry booklet now: Contains complete information on the Steel Highway Bridge Design Competition—everything you need to know to prepare your entry. Just fill in and mail the coupon and get started with your design without delay.

Awards for College Engineering Students

	each
1st Award.....	\$4,000.00
1st Honorable Mention.....	\$2,000.00
2nd Honorable Mention.....	\$1,000.00
Four 3rd Honorable Mentions.....	\$ 500.00

Problem: Get two lanes of traffic across a modern 4-lane highway in accordance with latest standards for today's highways.

Objectives: Originality of design, greater utilization of the inherent properties of steel, economy, and aesthetic appeal.

Requirements: Just one. The steel bridge must comply with the Geometric Standards for the National System of Interstate and Defense Highways using H-20-816-44 loading. The type of structure, the type of connections, span length and number of piers, if any, are completely up to you since you are designing with steel.

Eligibility: The competition is open to all professional and design engineers and college engineering students except employees

Awards for Professional Engineers

	each
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1st Honorable Mention.....	\$10,000.00
2nd Honorable Mention.....	\$ 5,000.00
Five 3rd Honorable Mentions.....	\$ 1,000.00

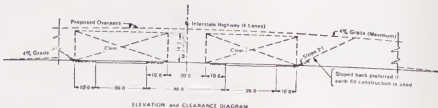
and/or members, and their immediate families, of the following firms and groups:

United States Steel and its subsidiaries, divisions, agents and dealers
Structural steel fabricating firms
American Institute of Steel Construction
Rules Committee and Judges

See list of awards above.

Rules and Judging: The competition will be under the supervision of the American Institute of Steel Construction, which has appointed a Rules Committee and a panel of judges composed of prominent consulting engineers and architects.

Deadline: Entries must be postmarked or expressed to arrive not later than midnight, May 31, 1959. *USS is a registered trademark*



**Competition Editor, Room 1831
American Bridge Division
525 William Penn Place
Pittsburgh, Pennsylvania**

Please send me a copy of your \$44,000 Steel Highway Bridge Design Competition entry booklet.

Name.....

Professional or Design Engineer } (Check one) ☐
Engineering Student } ☐

Street.....

City..... State.....



United States Steel

You're on the right road...

The biggest construction job in history is under way. It's the building of a vast new network of Interstate Highways. Miles and miles of highway. For trucking. For travel. For defense. Some 41,000 miles in all. In addition, many thousands of miles of primary and secondary roads are being built in a greatly expanded "ABC" Highway Program.

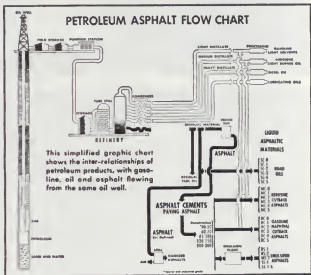
With these new highways will come new industries ... new communities ... a greater share in national life for everyone.

It's a big job ... an important job!

And you're on the right road when you study asphalt technology ... asphalt's characteristics and its applications in pavement construction.

Asphalt pavement is playing a leading role in the construction of the Interstate System.

It now surfaces 81% of State Primary and Municipal Extensions—the nation's most heavily traveled



roads—and 85% of all paved roads and streets in the country.

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Do you know, for example, how Asphalt fits into the over-all petroleum family? This chart illustrates the inter-relationship of Asphalt with other refined petroleum products.

The semi-solid form — Asphalt cement — is the basic paving material. It is used in hot-mix Asphaltic pavements for roads, airfields, parking lots and thousands of construction and industrial applications.

Liquid Asphalt materials — road oils, emulsions and cutbacks — are used extensively for a variety of construction and specialty applications.

Special Student Kit on Asphalt Technology Free!

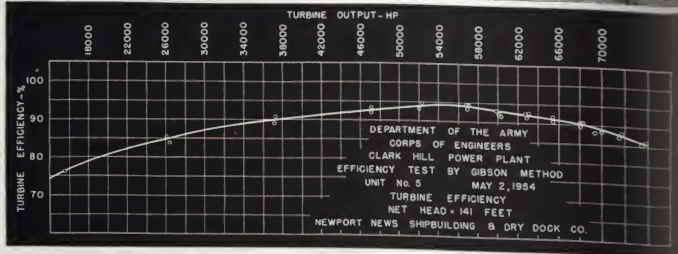
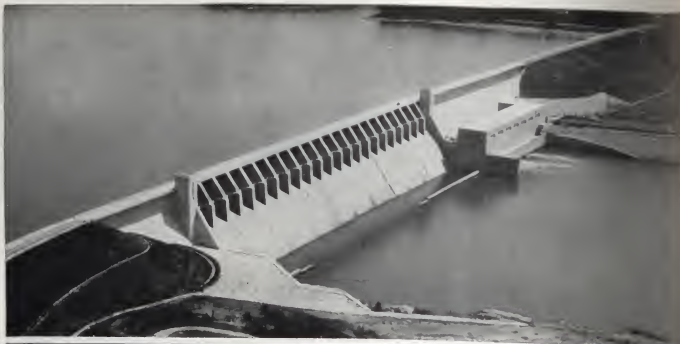
Literature included gives you a broad concept of Asphalt products—its sources, production, characteristics and uses. Put yourself on the right road by sending for your kit today. A postcard will do.

THE ASPHALT INSTITUTE

Asphalt Institute Building,
Campus—University of Maryland
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ASPHALT-paved Interstate Highways



Maximum efficiency of 94.1%

Reflects advanced practices at Newport News

THE GRAPH shows performance of a 55,000 horsepower turbine, one of seven such units built by Newport News for the Clark Hill Power Plant (see photo).

Shape of the curve is typical ... not exceptional ... for Newport News turbine performance. Regular, uniform, showing no-cut-off at full load, it indicates consistent delivery and stable operation.

And especially, *experience in design and model testing.*

At Newport News, turbine runners are continually being designed and redesigned for improvements in

performance. And often upon receiving a contract for turbines, a model setting is built and complete tests made. So far, Newport News has filled turbine contracts with an aggregate rated output in excess of 7,000,000 horsepower.

Penstocks, spiral casings, valves, pumps, rack rakes and other essentials are also designed and built by Newport News. Our illustrated booklet, "WATER POWER EQUIPMENT," will be sent to you upon request.

Engineers ...Desirable positions available in this commercial shipyard. Representatives at Placement Office annually. Arrange a personal interview or write Personnel Manager.

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Shipbuilding and Dry Dock Company
Newport News, Virginia

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GROOMING ELECTRONICS



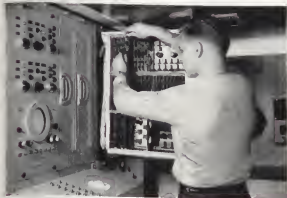
FOR THE SPACE AGE

Systems in the Air

The march of electronics into the Space Age is being quickened as a result of Hughes work in airborne electronics systems.

One such development is the Hughes Electronic Armament System, which pilots high-speed jet interceptors to enemy targets, launching Hughes air-to-air guided missiles, and flies the plane home. Even more sophisticated Electronic Armament Systems completely outstrip those presently released for publication.

Working on space satellites, Hughes engineers are active in the preliminary design of guidance and control systems, communication and telemetry systems, sensing devices using infrared, optical and radar techniques.



Data Processors, which monitor hundreds of aircraft and store the information for high-speed assignment of defense weapons, comprise one part of an advanced Hughes ground defense system.

Members of our staff will conduct

CAMPUS INTERVIEWS

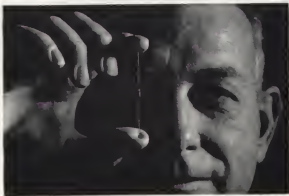
on February 13. For interview appointment or Informational literature consult your College Placement Director.

© 1958. HUGHES AIRCRAFT COMPANY

Information resulting from Hughes study in the fields of air-to-air and ballistic guided missiles is presently paying dividends into the fund of space knowledge.

Hughes engineers have developed space hardware using high-reliability wire wrapping to replace soldered connections and miniaturized "cordwood" circuit modules to allow high component density.

The advanced nature of Hughes electronic systems—in the air, on the ground, and for industry—provides an ideal growth environment for the graduating or experienced engineer interested in building rewarding, long-range professional stature.



Capacitors which provide for electrical, rather than mechanical tuning of circuits, are being produced by Hughes Products, the commercial activity of Hughes.

the West's leader in advanced electronics

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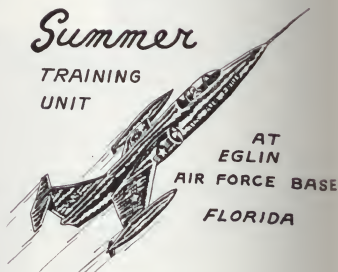
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A SHORT TOUR OF DUTY

... AFROTC Summer Camp

By FRANK NARR, BEE '60

With a click of the heels, a snappy salute and a "Cadet Joe Doaks reporting as ordered sir!", the Summer Training Unit at Eglin Air Force Base had officially begun. After the drudgery of dashing through the processing line, the next destination was supply for bedding. Upon the receiving of required issue, the task at hand was to make bunks in tip-top order, and groom oneself to the point of glowing, even with the help of spit and polish ... and FAST! Each cadet was soon to learn that time was of essence. There was so much to be accomplished each day that at the beginning it looked impossible. Let us look at a typical day ...



TRAINING SCHEDULE FLIGHT E

Day: Friday	Place	Instructor	Subject	Date: 8 August 1958
Hour				Uniform
0500	Camp Site		PT, Personal Hygiene	Appropriate
0645			Barracks Police and Breakfast	
0700	Building 66	Capt Cook	Pre-Flt & Post-Flt Briefings	Fatigues
0745			Pre-Flt & Post-Flt Briefings	Fatigues
0800	Building 66	Capt Cook	Organized Group Sports	Appropriate
0845			Organized Group Sports	Appropriate
0900	Camp Site	TAC Officer	Lunch	Appropriate
0945				
1000	Camp Site	TAC Officer	Chemical Warfare	Appropriate
1045			Flt. Safety	Appropriate
1100	Camp Site			Appropriate
1230				Appropriate
1300	Camp Site	TAC Officer	Drill (AF Summer Tng Guide)	Appropriate
1345			Retreat & Dinner	Class "A"
1400	Building 347	Maj Logan	Intramural Sports	Appropriate
1445				
1500	Camp Site	TAC Officer	Taps & Bed Check	
1545				
1630	Camp Site			
1800				
1800	Camp Site			
2000				
2000	Camp Site			
2100				

If one could squeeze free time out of that schedule, it was usually spent in polishing shoes, getting lockers in order, showering, or writing home.

One of the greatest displeasures was being placed on the guard duty roster. No one escaped; each cadet served at least 4 tours of duty.

At first, everyone welcomed meal time, it was a place to relax . . . but SOP No. 1000 stated that all cadets must sit on the first three inches of the chair and only one arm can be above the table at a time except during extreme emergencies (Like cutting meat). Oh well, you didn't want to rest anyway. So on the way out of mess one hears, "Hey Mister! Square those *—!—* corners!"

And yes, we had inspections too; every day as a matter of fact. On Saturday Morning at 0700 hours there was the stand-by (personal as well as room inspection). Preparedness was begun the night before by flashlight. Shelves, lockers, bed springs, and ventilating grills had to be completely free from dust; clothes had to be aligned in assigned order with the left shoulder toward the inspecting officer; and floors had to be waxed and polished.

Sunday was usually free but most cadets sacked out, all being bushed after the "vacation" of the previous week.

Since Eglin Air Force Base is the command headquarters for the AIR PROVING GROUND COMMAND, cadets were able to witness tests on a great deal of equipment in use today. All attended interesting lectures and saw the latest in bombers, fighters, rockets, missiles, and armament.

Here is a list of subjects cadets were exposed to and lectured on:

- Missiles
- Sanitation
- Air Base Defense
- Link Trainer
- Military Discipline
- Pre-Flight and Post Flight Briefings
- Chemical Warfare
- Aircraft Familiarization
- Parachute Packing and Operation



B-58 carried in bomb bay of world's largest bomber—The B-36.

- Climatic Hanger
- Base Operations
- Flight Operations
- Physiological Training (including the High Altitude chamber in which all cadets received actual experience)
- Operation of Fire & Crash Equipment
- Radar
- Weapons Familiarization (carbine and .45 cal. pistol)
- Survival Training
- Development of a Navigational Problem (this was followed through with a flight in a T-29, navigational training plane)
- Orientation Flight in a T-33, jet trainer
- Aircraft Maintenance
- Trip to Pensacola Naval Air Station to review naval procedures in instruction.

In addition to the above topics, Junior Officer Training, Drill, Organized Group Sports, and Intramural Sports completed a well-rounded program.

There were several points to be learned from STU, some of which are:

1. To be an officer in today's Air Force, one must be sound in judgment, clear in thinking, and alert to make accurate decisions . . . fast.
2. To show potential Air Force officers the operation of the world's largest Air Force Base and how activities can be coordinated among thousands of people.
3. To keep the USAF head and shoulders above any other air force, engineers are the required personal to keep new and better aircraft and electronic gear in sight.
4. Today's Air Force is the deterrent force to any future major world disorder.

I hope this script may give our readers a broad picture of what the AFROTIC Training Program offers and to the young men who have not yet experienced a summer camp, some insight to the future. To have the opportunity to visit Eglin Air Force Base is a thrill, an experience in which one really can see the results and efforts of accomplished engineers.



B-58 — The World's Fastest Bomber.

WHY SCHOOL ACTIVITIES?

... For Progressive Engineers Only

By CLIF HALL, BEE '60

Art Work—STEVE DIETZ, BEE '60

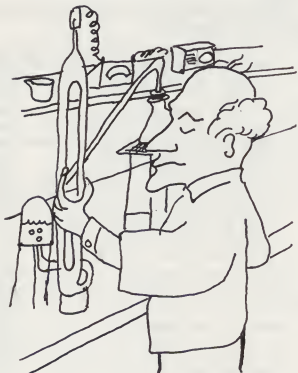
Why are you in engineering school? There are many motives for being an engineering student. Basically, however, they can be grouped into two categories. One, you are here to get an engineering degree and, two you are here to become an engineer . . . There can be a great deal of difference. Fortunately, not many do the work necessary to

obtain a B.S. in Engineering unless they are genuinely interested in being an engineer and doing engineering work.

The question then to ask the would-be engineer is, "What type of an engineer are you going to be?" Every engineer wants to be a good engineer, but the question is, "How?" Before we decide that, let us look briefly at the engineering profession.

Engineer, to many of us, has meant a rugged individualist. In our mind's eye, there is the lone figure in khaki's and boots, pushing a railroad through the desert or mountains, or perhaps an Edison-like figure working long hours in a lab, keeping a solitary vigil until a momentous discovery is made. There is still a need for the rugged individualist and the lonely genius and there will always be a need for the person who doesn't know it can't be done, so he goes ahead and does it.

The day of the engineer pursuing his work alone has almost past. The solitary genius and stubborn plodder is disappearing as group effort is coming to the fore. Modern technology is such that in few instances is the work of one man sufficient on a project. Even an Einstein could not, in the time allotted, do the work necessary to develop a guided missile, launch a satellite, or send a ship to the moon. It is necessary to pool the work of many men to reach the goals necessary in our headlong race for technological supremacy. Individual accomplishment is no longer as important as team work.



LONE RESEARCH . . . for Geniuses Only



TEAMWORK . . . Means to an End

The engineering profession offers two ways to be a good engineer. You can be the lone genius or work as part of a team. Few of us can pose as geniuses, so we must learn to be an efficient team member. It is unfortunate that there is no single class to take to teach us how to work well with people and there is no formula to plug the members into to give us the answer.

The only way to learn to get along with others is to learn through experience. All of our lives we have been learning how to fit into our social system. Now we must acquire the skill needed to fit into, what we might call, an engineering system.

Learning to become a good member of a system isn't easy for some. The type of study necessary to complete a B.S. in Engineering tends to develop the student as an individual. The state of the art is so far advanced that there is no time left in four years to study human nature. It may even be necessary soon to have five years of engineering subjects. Yet, it is becoming increasingly evident that the engineer must learn more about people and how to work well in a group.

At the present there appears to be only one solution to the problem of how to learn to be a good member of the team. That is to become active in the professional organizations and other student activities on campus. For the interested student there are many such activities. The professional

societies and fraternities and the Engineer's and Student Councils are the main ones.

The benefits of being active in school functions are immediately evident upon graduation. The highest wages paid graduates go to the students who have shown, through school activities, that they can get along well with people and to students with high marks. A high Q.P.I. and a good activities record is a combination that can't be beat when it comes to earning a high salary.

The ability to get along with people and to lead in activities is carried over into the professional career. Unless an engineer is a genius, the value of his output has a limit. The limit set for the value of a leader and organizer, however, is only determined by the worth of the personnel he directs.

From every angle it's a paying proposition to be active in student affairs. There is personal pleasure to be gained from many of the activities and there is the satisfaction in seeing a job well done. Mainly, activity in student affairs is going to make you a better engineer and increase your value to your future employer, and this value is going to be directly reflected by the salary you can command.



SCHOOL ACTIVITIES . . . A place to Start

Where To?

By WOODROW W. EVERETT, JR.
Engineers' Council President

In this first issue of *Mecheleciv* I would like to extend to all the students of the School of Engineering greetings from the Engineers' Council, the student governing body of the School of Engineering. It is my sincere wish that the year will be a happy and fruitful one for you.

At the beginning of every year, a student has to decide what extracurriculas he plans to participate in. In the School of Engineering this is an especially difficult decision because of the heavy work-load that is necessary for a degree. However, it is important that extracurriculas are not neglected by you because these activities offer a vast amount of experience in the art of getting along with your contemporaries. Because you are an engineering student, it is especially important that you allocate time to extracurriculas for the simple reason that you are getting a very technical education and any extracurriculas help you to become more of a well-rounded individual who will be an asset to your community. For this reason I wholeheartedly recommend activities to you.

The School of Engineering offers a wide variety of extracurriculas to any student regardless of his interest or curriculum. The Engineers' Council coordinates the several organizations of the School and serves as the student governing body. The Engineers' Council consists of two representatives from each undergraduate class, the Business Manager of *MECHELECIV*, the Davis-Hodgkins House Manager, the Student Council Representative, the Theta Tau representative, the Sigma Tau representative, and a representative from each of the four professional engineering societies. The Council sponsors such activities as the Annual Engineers' Mixer (a social gathering of students, faculty, and alumni to welcome new students), the Annual Christmas Tree Lighting Ceremony (a traditional ceremony in which the Engineering students provide the University with a lighted Christmas Tree), registration assistance to all students, and the Engineers' Banquet and Ball, which climaxes the year's work with a dinner, dance, and awards.

The *MECHELECIV* magazine and the *ENGINEERS' GUIDE* are the official publications of the School of Engineering and are published at the direction of the Engineers' Council. *MECHELECIV* is published six times yearly and features articles written by the students of the University. *MECHELECIV* offers many positions yearly on the business and editorial staffs, and valuable experience in

field of journalism can be gained by all staff members. The *ENGINEERS' GUIDE* is published annually for the information of the student body and offers detailed information on the academic and extracurricula phases of the School.

There are four professional societies on the School campus. They are the American Institute of Electrical Engineers, the Institute of Radio Engineers, the American Society of Mechanical Engineers, and the American Society of Civil Engineers. The professional societies meet on the first Wednesday of each month and offer movies, field trips, professional speakers, and various other forms of programs related to their chosen fields. Refreshments are served at the conclusion of the meetings to provide an air of informality.

The two fraternities of the School, Theta Tau and Sigma Tau, provide social events and services to their members. Theta Tau is a national professional fraternity; Sigma Tau is an honorary. Membership in both is by invitation.

It is your duty as an engineering student to investigate all possibilities of the Engineering School extracurriculas to determine the ones suited for you. By so doing and by participating in the various extracurricula activities you will help yourself and your school.

A Prof and His Homework

Professor Benny Cruickshanks has given his TV set, which was presented to him at the Engineer's Ball and Banquet, a good work out this summer. The ball games came through fine and the pepsi and pretzel look like they hit the spot. We're glad you enjoy the set Benny . . . are you going to have it in class for the World series?



Benny at work.

AIEE-IRE

Joint Student Branch AIEE-IRE, the largest of the student engineering societies at The George Washington University, may not be "shooting for the Moon" this year, but it will present stellar attractions each and every meeting! The program for the whole of the 1958-1959 season is now complete. The preliminary objectives—to present prominent speakers to deal with varied engineering subjects not specifically taught as part of the curriculum; yet, to present speakers to deal with varied engineering subjects in such a manner as to evoke interest on the part of each class (Freshman thru Senior), has been attained.

Membership in the Joint Student Branch is open to all students in the School of Engineering, so why not "fuse" with your fellow students and join AIEE-IRE. "Jet" on down each month and attend the meetings; hear what all of these outstanding men have to say; and help "rocket" AIEE-IRE through its most successful season. Space, to AIEE-IRE, is no problem—Room 200 Tompkins Hall is plenty large enough.

It is the hope of the Officers and Program Committee that the following calendar of events will prove of definite interest to all present members and provide a sphere of interest to new students:

On November 5, 1958, Dr. John P. Hagen, Director of the United States Satellite Project, and Superintendent of the Atmosphere and Astrophysics Division of the Naval Research Laboratory, will speak on "SCIENTIFIC RESEARCH IN SPACE." Dr. Hagen, a recipient of the Presidential Certificate of Merit, has been with N.R.L. since 1935 and is in charge of microwave radar and radio astronomy. A radio astronomer by profession, Dr. Hagen is certainly well known to every American for his recent accomplishments in getting an earth satellite into orbit. His talk will cover the general subject of missiles and satellites, as well as an explanation of what has been learned about outer space from our present satellites and what yet remains to be learned before it is possible for manned space flight.

On December 3, 1958, Dr. William B. Kouwenhoven, Professor Emeritus and Lecturer in Surgery at the Johns Hopkins University, will speak on "THE EFFECTS OF ELECTRIC SHOCK ON THE HUMAN BODY." His talk will be augmented by slides and movies. This is one meeting that is a must for every future E.E. Dr. Kouwenhoven is one of the leading authorities on the subject he will present and has written many articles and papers on electrical measurements, magnetic analysis, and electric shock.

ASME

The student branch of the A.S.M.E. has for its purposes the development of interest in the varied fields of mechanical engineering, the promotion of friendship among students, and the attainment of professional stature by the members.

During the past summer, the executive committee of the A.S.M.E. has held several meetings in order to select a program which will fulfill the purposes of the society. This program promises to be quite different from the types of programs which have become commonplace in the School of Engineering during the past years.

There will be two movies selected for interest and content and several professional speakers who will speak on new developments in their field of employment. The remainder of the sessions will be devoted to talks of a professional nature which will be given by the students.

These talks by student members will not only serve to develop interest in mechanical engineering, but will aid the students in developing the stature and confidence necessary in any profession.

The student speakers are being aided academically, professionally and financially. The persons who present the three best talks are awarded prizes which range from \$30 to \$10. The student who is awarded first place then gives his talk at the local chapter of the A.S.M.E. in competition with students from Maryland, Howard and Catholic Universities. At this competition, cash prizes are presented to all speakers. In the spring, this speaker will attend a regional conference, and compete with students from approximately twenty universities for four awards ranging downward from \$50.

At the end of each meeting, refreshments will be served, followed by a general "bull session," which allows members to form friendships with others who are interested in the same professional career.

Membership in the society is open to candidates for degrees in any field of engineering. Why not attend the monthly meeting of the A.S.M.E. in room 205 of Tompkins Hall? It is well worth the time and effort, as you will discover after attending a meeting.



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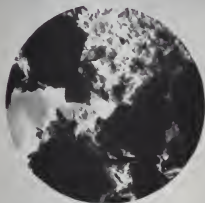
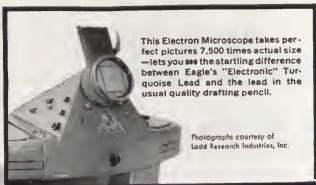
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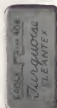
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Theta Tau

The Theta Tau Fraternity was organized on Oct. 15, 1904 at the University of Minnesota. Since then it has become a national organization and at present it has 27 chapters in the major universities of the country. It is a professional fraternity, and as such occupies a unique position at the University. This is due to its dual nature as both a professional and social organization.

As a professional organization, Theta Tau is dedicated to improving the engineering profession in general, and improving the qualifications of its members in particular. As a social organization, Theta Tau is dedicated to promoting strong bonds of friendship among its members which will endure long after the members enter their professional life.

Theta Tau is not an organization which functions only during the school year; it is also active during the summer vacation. During the past summer, meetings were held twice monthly, and a regular social schedule was planned and carried out. The summer season was begun with a picnic. This picnic was held on Memorial day at the Bel Air picnic grounds in Arlington, Virginia. A full schedule of sports and other activities was indulged in, and suitable amounts and types of food and beverages were consumed.

The second event of the summer was a weekend crab feast held at a cottage on Cobb Island in the lower Potomac. This affair began on Saturday morning and lasted until Sunday evening. The activities ranged from swimming, sunning, and boating to poker playing, and considerable amounts of steamed crabs and cold beer were consumed.

The third event of the summer was a picnic for members and prospective pledges at Fort Foote in Maryland. The fourth and last outing of the summer was a weekend trip to Ocean City, Maryland and this ended the summer season on a happy and appropriate note.

During the school year the social schedule is fitted to the demands of the members and the only events which are rigidly observed are a fall and spring Banquet and Ball. These events are held to commemorate the national founding on Oct. 15 and the local founding on March 16. The new members are also initiated on these days and are officially welcomed into the Fraternity at the Ball and Banquet.

The only requirements for membership in Theta Tau are that you must be a student in good standing in the School of Engineering, you cannot be a first semester freshman or a second semester senior, and you must be interested in joining. The

pledges are nominated by the members and if they are approved by all the members they are given certain pledging tasks to perform. The pledging period usually lasts four weeks and ends on the day of the Ball and Banquet, at which time the pledges are formally initiated.

The Fraternity Pin of Theta Tau symbolizes the professional nature of the organization. It is a gold Gear Wheel with crossed hammer and tongs and the letters Theta and Tau. In the center of the wheel is a dark red garnet, and the inner rim of the gear wheel is jeweled with pearls. The Pin may be worn by members only, and is always worn on the left side.

This Pin emphasizes the dedication of Theta Tau to improving the engineering profession, and to making its members better Engineers and a credit to their profession.

Sigma Tau

Sigma Tau Fraternity is a national fraternity for engineers which is represented on The George Washington University Campus by Xi Chapter.

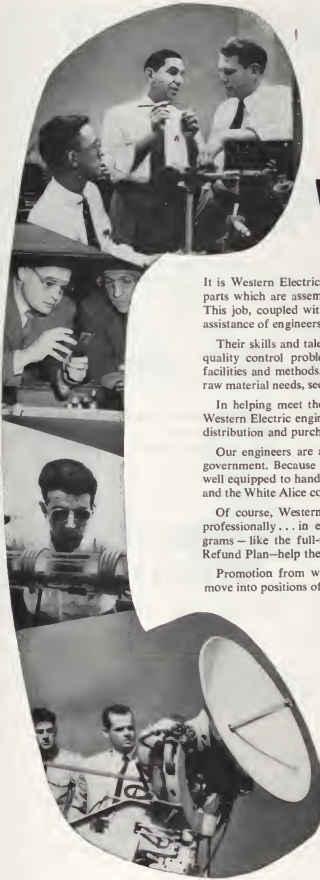
Sigma Tau was founded on the 22nd of February, 1904, when a group of upper classmen of the Engineering College of the University of Nebraska held a banquet and announced the organization of a new honor society in the field of engineering.

The motives that guided the founders came from a general desire to be of service to engineering education in the institution where the fraternity was first established. During the early years of Sigma Tau, a man had to have some practical experience in the engineering field in order to be considered a candidate for membership. As engineering enrollment increased, this requirement was abandoned in order to permit the initiation of those students who, in the judgment of their associates, possessed those qualities which make for success in the engineering profession.

Membership in Sigma Tau is selected from those students who rank in scholarship among the upper third of the juniors and seniors in the engineering school. Further selection of members is made on the basis of practicality and sociability. Each candidate selected must have the written approval of at least three members of the engineering faculty.

Once during the course of each semester, Sigma Tau chooses those men which are thought to be worthy of the honor of membership. After the initiation of the new members a banquet is held in their honor.

For the first time this year, Sigma Tau has the privilege of administering, grading and analyzing
(Please turn to page 22)



It takes all kinds of engineers to do Western Electric's job

It is Western Electric's job in the Bell System to manufacture some 65,000 different parts which are assembled into a vast variety of telephone apparatus and equipment. This job, coupled with our other responsibilities as part of the System, requires the assistance of engineers in every field.

Their skills and talents are needed to develop new manufacturing techniques, solve quality control problems, determine machine and tool requirements, devise testing facilities and methods. They work on new applications for metals and alloys, calculate raw material needs, seek manufacturing cost reductions.

In helping meet the Bell System's need for more and better telephone equipment, Western Electric engineers have assignments in the other areas of our job—installation, distribution and purchasing.

Our engineers are also deeply involved in defense projects entrusted to us by the government. Because of our specialized experience as part of the Bell System we are well equipped to handle the job. Among these projects: the Nike guided missile system and the White Alice communications network in Alaska.

Of course, Western Electric engineers are encouraged and assisted in developing professionally... in expanding their technical know-how. Company-sponsored programs — like the full-time Graduate Engineering Training Program and the Tuition Refund Plan—help them along.

Promotion from within—a Western Electric policy—helps many of our engineers move into positions of prime responsibility. Today, 55% of the college graduates in our upper levels of management have engineering degrees. In the next ten years, 7,000 key jobs must be filled by newly promoted people—engineers included.

Western Electric technical fields include mechanical, electrical, chemical and civil engineering, plus the physical sciences. For more information pick up a copy of "Consider a Career at Western Electric" from your Placement Officer. Or write College Relations, Room 1111D, Western Electric Company, 195 Broadway, New York 7, N. Y. And sign up for a Western Electric interview when the Bell System Interviewing Team visits your campus.

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School of Engineering Honor List

Spring Semester 1957-58

The Faculty of the School of Engineering has provided for the recognition of meritorious scholastic achievement by the display and publication of an Honors List.

As a matter of possible interest, the Honors List contain "... in alphabetical order, the names of candidates for an undergraduate degree in engineering whose scholastic achievement satisfies all of the following requirements

- "(a) The candidate's cumulative quality-point-index is equal to or exceeds 3.00.
- "(b) At least 30 semester hours credit has been earned as a degree candidate in the School of Engineering.
- "(c) At least 15 (part-time student) or 30 (full-time student) semester hours credit in an engineering degree curriculum has been earned in the immediate two consecutive semesters.
- "(d) No grade below "C" has been received during the qualifying period stated in (c) above.
- "(e) No disciplinary action has been taken in respect to the student."

Baechler, Donald O.
Beard, Richard M.
Beck, Henry D.
Bennett, Roland K.
Beuttenmuller,
Richard A.
Birch, Terrell
Burnham, John M.
Clemons, Ormond L.
Coleman, Thomas W.
Crawford, James G.
Davis, Wayne A.
Dietz, Stephan K.
Federline, James D.
Fentress, Alvin K.
Gillilland, Kitt E.
Grossman, Ronald A.
Hatakeyama,
Lawrence F.
Hill, Howard T.
Horiuchi, Harold S.
Hui, Peter S. P.

Joyce, John D.
Kaminetsky, Jerry
Lanyi, Thomas
Lokerson, David T.
McChesney, Donald W.
Mac Donald, Robert C.
Macurdy, Arthur C.
Moore, Robert M.
O'Neale, John D.
Potterton, Richard L.
Sapardiman, Soeseno
Sibul, Leon H.
Snyder, Arnold L.
Spencer, Thomas K.
Spithas, E. Nicholas
Thau, Stephen A.
Trenyor, Paul E.
Tsakos, Steven
White, David M.
Wilkinson, Herbert S.
Williams, John H., Jr.
Yakscoe, Andrew J.



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In nuclearics, Andrew Selep, Brooklyn Polytechnic Institute, BME '53, is working on the problem of reactor safeguards.



Special engineering by Paul W. Clark, Iowa State College, EE '49, is of large job involving combined electrical equipment.



Sales manager, Robert Harn, Marquette University, EE '51, heads sales of voltage regulators used on power lines.



Electronics man, William E. Martin, Alabama Polytechnic Institute, BSEE '53, engineers applications of induction heaters.

plus wide choice of type and fields of



Design of generators for steam turbines is directed by G. W. Staats, Illinois Institute of Technology, Ph. D. '56.



Field sales of America's widest range of industrial equipment is coreer of Carl E. Hellerich, U. of Nebraska, ME '49.



Promotion man, Robert I. Carlson, Worcester Polytechnic Institute, ME '50, directs promotion of switchgear, and substations.



Application and sales of steam condensers for power plants are handled by William E. Ellingen, U. of Wisconsin, ChE '49.

work on equipment for many industries

THE outstanding training course started by Allis-Chalmers has proved a springboard to many worthwhile careers. In fact, most of the A-C management team has stemmed from its ranks.

Up to two years of theoretical and practical training are offered. This experience leads

to jobs in research, design, manufacturing, application and sales.

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NEWS IN INDUSTRY

1,000,000 Lb. Thrust Vehicle

An Air Force contract to begin development of major components for a rocket engine in the one million pounds thrust class has been awarded to Rocketdyne, a division of North American Aviation, Inc.

Awarded by Wright Air Development Center after design competition among the nation's rocket firms, the contract began work toward the giant thrusts acknowledged to be essential first steps in manned interplanetary exploration. The development of a single-chambered engine in the million-pound class will make a cluster of six for a six-million-pound thrust relatively easy.

Simultaneously, the Air Force under separate contract extended Rocketdyne development of a previously undisclosed engine to provide thrust

in the intermediate range between current propulsion systems and the huge million-pound engine.

Both engines named are liquid propellant systems, similar in principle to Rocketdyne engines for the Atlas ICBM, the Thor and Jupiter IRBM's and the Redstone missile that provided the first-stage boost for the satellite launching Jupiter "C."

Work is being extended that will provide vital experience and refined rocket-engine hardware for application to very high-thrust ranges. It also was applicable to a broad range of significant missions requiring intermediate thrust levels.

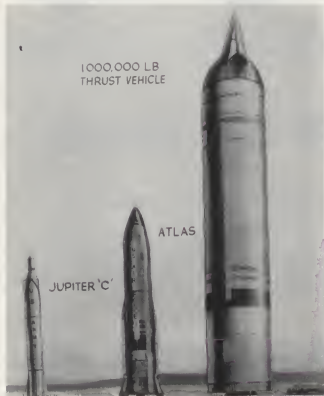
Atomic Race Track



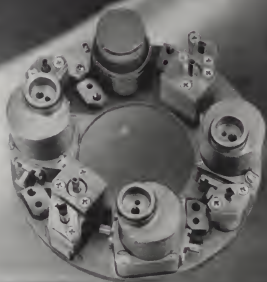
Now being built at Brookhaven National Laboratory on Long Island (N.Y.) is the world's largest and most powerful atomic machine—a mammoth new proton synchrotron.

The heart of the synchrotron is the combination of 240 magnets arranged in a circle more than a half mile in circumference, inside which is placed a vacuum chamber seven inches in diameter and 3 $\frac{3}{8}$ inches high. The giant magnets will develop enormous magnetic forces of 10,000 to 13,000 gauss, and will be buried in a giant subterranean cement tunnel, 17-feet 9-inches high and 18-feet wide. The tunnel will be covered with twelve feet of earth.

(Please turn to page 22)



CREATIVE ENGINEERS



AiResearch engineered and produced this electro-hydraulic servo system—the most reliable and responsive steering control system for missiles yet produced. Extremely lightweight, it consists of three control valves and six actuators.

This unique system represents but a part of the challenging, important work under way at AiResearch in missile, electronic, nuclear, aircraft and industrial fields.

Specific opportunities exist in system electronics and servo control units; computers and flight instruments; missile auxiliary power units; gas turbine engines and turbine and air motors; cryogenic and nuclear systems; pneumatic valves; industrial turbochargers; air conditioning and pressurization; and heat transfer, including electronic cooling and nuclear applications.

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ducted by small groups where individual effort and accomplishment are quickly recognized, providing opportunity for rapid growth and advancement. An eight-month orientation program is offered prior to permanent assignment to help determine your placement from a variety of analytical or development projects.

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Which of the following are practical applications of COPPER or COPPER ALLOYS ?

- ☐ 1. Ship fittings.
- ☐ 2. Television antennae.
- ☐ 3. Heat sinks for missile nose cones.
- ☐ 4. Architectural extrusions.
- ☐ 5. Prefabricated plumbing lines.
- ☐ 6. Pipelines for sodium hydroxide.
- ☐ 7. Collector vanes for solar heating.
- ☐ 8. Resistance heating elements.
- ☐ 9. Resistance-welding electrodes.
- ☐ 10. Gold-plated jewelry.

Now try your hand at these True-False Selections:

- ☐ 11. Proved copper reserves have decreased in the last 20 years. ☐ T, ☐ F.
- ☐ 12. On the machinability rating scale, Free-Cutting Brass rates 100. ☐ T, ☐ F.
- ☐ 13. The green patina of copper can be developed artificially. ☐ T, ☐ F.
- ☐ 14. Copper and copper alloy parts should be joined only by riveting. ☐ T, ☐ F.
- ☐ 15. Nickel Silver is an alloy of nickel and silver. ☐ T, ☐ F.

1. Yes. Copper, and many of its alloys, have excellent resistance to salt water corrosion.

2. No. The important properties of copper are not needed and lighter, cheaper metals are usually used.

3. Yes. Copper's high heat conductivity protects the delicate instruments inside by quickly dissipating the surface heat of re-entry.

4. Yes. Architectural bronze extrudes readily and is used for a wide variety of architectural shapes.

5. Yes. Because copper tubing can be easily

and firmly soldered, it lends itself well to prefabrication. The few unassembled joints are soldered on the site, eliminating the use of threaded fittings.

6. Yes. Copper-nickel alloys have good resistance to many alkalies and are often used in contact with them.

7. Yes. Large vanes of copper are blackened and mounted on a roof to collect the sun's rays. The high thermal conductivity of copper makes it very efficient for this use. The copper carries the heat to a circulating water system.

8. No. The conductivity of copper and its alloys is too high for this purpose.

9. Yes. Here the current is introduced through the electrodes to the parts to be welded. Several copper alloys are well suited for this use because of their high strength at elevated temperatures.

10. Yes. The low-zinc brasses are easily worked and are readily plated for high-quality costume jewelry. Most copper alloys lend themselves well to polishing and plating.

11. False. Reserves have increased. Published figures are no indication of long run availability or total mineral deposits. The industry lists only those reserves which have been "proved" for immediate development. Since the copper industry has grown in these years, so, too, have the proved reserves. Future copper supplies are vastly greater than any known "reserve" figures would indicate.

12. True. Free-Cutting Brass usually can be turned at maximum spindle speed and many other copper alloys at high speeds. A large number of copper alloys are available for easy machining.

13. True. The Copper & Brass Research Association has developed a spray process which has been successfully used to give architectural and ornamental parts an attractive green patina much faster than nature would do it.

14. False. Good joints between copper or copper alloy parts can be made by soldering, brazing or welding.

15. False. The Nickel Silvers are copper alloys. They derive their name from their silver-like color. A typical composition is 65% copper, 18% nickel, 17% zinc, and no silver at all.

The copper alloys, of which there are more than forty that are standard and many more that are special in current use, have many properties just as unique as this "silver" that isn't silver. If you'd like to learn more about them, or if you really flunked this quiz, send for your copy of "A Guide to Copper and its Alloys." The Copper & Brass Research Association, 420 Lexington Avenue, New York 17, N. Y., will be happy to supply it.

"A GUIDE TO COPPER AND ITS ALLOYS"



28-page booklet issued by the Copper & Brass Research Association covers the Coppers, Brasses, Bronzes, Nickel Silvers and special alloys. The histories, properties and applications of each class of metals are reviewed in the illustrated text and tables. Write for your copy. Address Copper & Brass Research Association, 420 Lexington Avenue, New York 17, N.Y.

Graduate Engineering Administration Program

Now beginning its fourth full year, the graduate program in Engineering Administration at the School of Engineering of The George Washington University seems to meet an urgent need in the engineering programs of government and industry.

The fact is attested by the variety and number of engineers who have taken the courses since the establishment of the curriculum in 1955. Approximately 600 Engineers from all fields have enrolled in its courses.

Designed to give the practicing engineer in any field a sound training in administration of laboratories, projects or businesses, the program has drawn students from most of the local and national offices and firms engaged in engineering in the Washington area.

The more than 350 graduate students enrolled last semester came from 23 Federal agencies, 37 private firms and three other schools of engineering.

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Sigma Tau (Continued from page 14)

the placement examination for all incoming freshmen engineering students. In this way, we are able to serve the school. From the results of these examinations we are able to obtain a good cross-section of the new students, who are the potential members to whom we must turn to carry on the good name of our organization.

Sigma Tau offers a tutoring service, free of charge, to any engineering student in need of help in his studies. For assistance in difficult subjects call Terry Birch at JUniper 7-7305.

Race Track (Continued from page 18)

The vacuum chamber, which is located in the jaws of the "C" of the magnets, will contain a clear aperture $2\frac{3}{8}$ inches high and six inches wide. It is through this narrow aperture that a beam of protons will be made to travel as they are accelerated to tremendous energies.

Before the protons go into the synchrotron, their energy is first raised in a high-voltage generator to 750,000 electron volts. From here, they go into a linear accelerator and by stages are raised to an energy of 50,000,000 electron volts, and at this stage they are injected into the half-mile track to whirl round-and-round. Each time they go around the track, twelve radio-frequency accelerating stations give them additional boosts in energy so that at the end of their travels—one second in which they have gone around the half-mile track some 350,000 times—they are traveling with an energy of 25-to-30 billion electron volts, and at a velocity approaching the speed of light.

At precisely this moment the proton hits the nucleus of an atom and "breaks" it so that protons and neutrons are released. In addition, a variety of mesons will also be created. The meson is a mysterious particle, and is believed to be a special cosmic cement that holds the parts of the atom together.

Once this is done, Brookhaven scientists hope to be able to observe through various ways what happens and what are the forces which really hold the nucleus together.

What happens at Brookhaven in 1960 may mean the beginning of a great new world of tomorrow.

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FEderal 3-1818

INCO NICKEL
PROGRESS REPORT

Freezing water to warm a mine

Inco shows a king-size operation
that helps mine more Nickel

The bigger the mine, the more men at work, the more *air* they need. Gales of air. Warmed in winter. Cooled in summer. That's the reason for this mammoth "air conditioner" in an Inco-Canada mine.

In winter it raises the temperature of cold air from outside *by making ice*. In summer it uses the ice to cool air that's too hot! (See diagram below)



In winter, cold air is blown through sprays of warmer water. The water loses its heat, freezes into mountains of solid ice. In the process, the latent heat of freezing is transferred to the air, warms it up for use inside the mine.

At full capacity in a winter season, this system alone can generate as much heat as 350,000 gallons of fuel oil. During this period, 150,000 tons of ice may form. (See photo at left)

Installations like this are expensive in time and money. Such outlays are typical of many made by Inco-Canada. Their cost adds up to millions. Results are—to continue the increased production of Nickel.

Mining for Nickel is a 45-minute color film loaned to high school science groups, college engineering classes and technical societies. Write to Educational Service, Development and Research Division,

The International Nickel Company, Inc.
New York 5, N. Y.



International Nickel

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A mountain of ice, built up in this inside-a-mine "air conditioner." The rock chambers, or "stopes," where the ice forms, are high as a 23-story apartment, big enough to house 300 families. Things have to be done in a big way to get Nickel in the tremendous amounts used by industry to make metals that perform better, longer.

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If you prefer a Holder, try LOCKTITE Tel-A-Grade 9800 which shows your degree in a flash—plus imported "black gold" CASTELL 9030 Lead. Shop in your college store and insist on CASTELL across the board.

Grace: How's Abel Jones getting on with that school teacher he's calling on now?

Hazel: Well, every time he goes to see her she keeps him an hour longer for being naughty.

Luke: Gosh, but I'd like to make your dreams come true.

Lulu: I'll slap your face if you try it.

Maisie was in a bar having beer when a friend from England walked in.

"Ay say, Maisie, are you 'aving none?"

"No, it's just the cut of me dress."

"What's Mabel mad about?"

"She stepped on one of those scales with a loud speaker and it called out 'One at a time, please.'"

"Hey dad, I'm home from school again."

"What the devil did you do this time?"

"I graduated."

Freshman: "Say, why'd you go out with that sad looking girl the other night?"

Chemical: "Why not, she's one in a million."

Freshman: "Huh, how's that?"

Chemical: "She agreed to go out with me."

Frosh: "My roommate says there are some things a girl shouldn't do before twenty."

Soph: "Well, personally, I don't like a large audience either."

Little Jack Horner

Sat in a corner

Crib notes under his eye.

He opened his book and

Took a quick look,

And now he's a Sigma Tau

A Scotchman and Irishman were on board a ship bound for Scotland.

The Scotchman on catching sight of homeland yelled, "Hurrah for Scotland."

The Irishman, a bit riled, replied, "Hurrah, Hell!"

To which the Scotchman countered, "That's right, every man for his own country."

SLIPSTICK SLAPSTICK

Hubby: "If there are any additions to this family, I'll shoot myself."

Wife: "Wait, dear, don't shoot an innocent man."

Finding her husband in a bar, she sampled the highball he was drinking and demanded, "How can you drink such horrible stuff?"

"See," said the husband, "and all the time you thought I was out having fun?"

"Was her father surprised when you said you wanted to marry his daughter?"

"Surprised? Why the gun fell right out of his hands."

M.E.: "I like mathematics when it isn't over my head."

Chem. E.: "I feel the same way about pigeons."

Dean: "Aren't you ashamed to be seen here so often?"

Engineer: "Why? I've always thought this was a respectable place."

Professor: A fool can ask more questions than a wise man can answer:

Student: "No wonder so many students fail your exams."

First Coed: "Does your boy friend have ambitions?"

Second Coed: "Oh yes, ever since he's been knee high."

"It's quite simple to hook up an electric power circuit," explained the E.E. "We merely lead leads to the terminals and pull the switch. If the motor runs, we take our readings, if it smokes, we sneak back and get another one."

Heard tell about the widow who wears black garters in remembrance of those who have passed beyond.

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Photography and x-rays pointed the way for Goodrich-Gulf Chemicals Inc. to achieve a synthetic that matches natural rubber.

Heavy-duty truck and airplane tires always had to have tree rubber to assure acceptable performance. Usual man-made rubber didn't quite fill the bill. Its molecules didn't hang together like natural rubber.

But now Goodrich-Gulf scientists, using x-ray diffraction photographs to check molecular structure, have produced Ameripol SN, a man-made

rubber with the same physical properties as crude rubber even to tack and stickiness. It's an achievement that can mean a source of supply for the nation's new-rubber needs.

Playing a part in research like this is only one of the many ways photography is working for business and industry today. In addition, it also delves into problems of product design, production, and quality control. It trains employees, dealers and salesmen—does a selling job right to the consumer.

Photography is saving time and

cutting costs for all kinds of businesses, large and small alike. It works for you in whatever occupation you choose.



Photographic negative showing the x-ray diffraction pattern produced by a molecule of natural, tree-grown rubber.



The x-ray diffraction pattern of a molecule of Ameripol SN rubber shows the scientist that this rubber is identical to natural rubber.

EASTMAN KODAK COMPANY, Rochester 4, N. Y.

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Kodak
TRADE MARK



One of a series*

Interview with General Electric's Earl G. Abbott Manager—Sales Training

Advancement in a Large Company: How it Works

Where do you find better advancement opportunities—in a large company or a small one? To help you, the college student, resolve that problem, Mr. Abbott answers the following questions concerning advancement opportunities in engineering, manufacturing and technical marketing at General Electric.

Q. In a large Company such as General Electric, how can you assure that every man deserving of recognition will get it? Don't some capable people become lost?

A. No, they don't. And it's because of the way G.E. has been organized. By decentralizing into more than a hundred smaller operating departments, we've been able to pinpoint both authority and responsibility. Our products are engineered, manufactured and marketed by many departments comparable to small companies. Since each is completely responsible for its success and profitability, each individual within the department has a defined share of that responsibility. Therefore, outstanding performance is readily recognized.

Q. If that's the case, are opportunities for advancement limited to openings within the department?

A. Not at all. That's one of the advantages of our decentralized organization. It creates small operations that individuals can "get their arms around", and still reserves and enhances the inherent advantages of a large company. Widely diverse opportunities and promotions are available on a Company-wide basis.

Q. But how does a department find the best man, Company-wide?

A. We've developed personnel registers to assure that the best qualified men for the job are not overlooked. The registers contain com-

plete appraisals of professional employees. They enable a manager to make a thorough and objective search of the entire General Electric Company and come up with the man best qualified for the job.

Q. How do advancement opportunities for technical graduates stack-up with those of other graduates?

A. Very well. General Electric is recognized as a Company with outstanding technical skills and facilities. One out of every thirteen employees is a scientist or engineer. And approximately 50 per cent of our Department General Managers have technical backgrounds.

Q. How about speed of advancement? Is G.E. a "young man's Company"?

A. Definitely. A majority of all supervisors, managers and outstanding individual contributors working in the engineering function are below the age of forty. We believe that a job should be one for which you are qualified, but above all it should be one that challenges your ability. As you master one job we feel that consideration should be given to moving you to a position of greater responsibility. This is working, for in the professional field, one out of four of our people are in positions of greater responsibility today than they were a year ago.

Q. Some men want to remain in a specialized technical job rather than go into managerial work. How does this affect their advancement?

A. At G.E. there are many paths which lead to higher positions of recognition and prestige. Every man is essentially free to select the course which best fits both his abilities and interests. Furthermore, he may modify that course if his interests change

as his career progresses. Along any of these paths he may advance within the Company to very high levels of recognition and salary.

Q. What aids to advancement does General Electric provide?

A. We believe that it's just sound business policy to provide a stimulating climate for personal development. As the individual develops, through his own efforts, the Company benefits from his contributions. General Electric has done much to provide the right kind of opportunity for its employees. Outstanding college graduates are given graduate study aid through the G-E Honors Program and Tuition Refund Program. Technical graduates entering the Engineering, Manufacturing, or Technical Marketing Programs start with on-the-job training and related study as preparation for more responsible positions. Throughout their G-E careers they receive frequent appraisals as a guide for self development. Company-conducted courses are offered again at all levels of the organization. These help professionals gain the increasingly higher levels of education demanded by the complexities of modern business. Our goal is to see every man advance to the full limits of his capabilities.

If you have other questions or want information on our programs for technical graduates, write to E. G. Abbott, Section 959-9, General Electric Co., Schenectady 5, N. Y.

***LOOK FOR other interviews discussing:** • Qualities We Look For in Young Engineers • Personal Development • Salary.

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